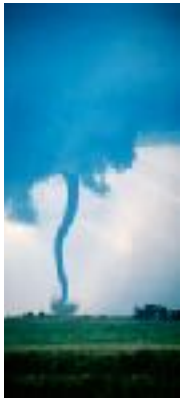
ISCRAM 2010

Seattle, Washington

Wireless Emergency Alerts: An Accessibility Study



The Rehabilitation Engineering Research Center for Wireless Technologies is sponsored by the National Institute on Disability and Rehabilitation Research (NIDRR) of the U.S. Department of Education under grant number H133E060061. The opinions contained in this presentation are those of the author and do not necessarily reflect those of the U.S. Department of Education or NIDRR.

Wireless Emergency Alerting

- **Next generation warning systems must provide equal access to emergency alerts – ICCEP & FCC**
- **American Red Cross responded to more than 70,000 disasters in 2008**
- **87% of the U.S. population use wireless services or products**
- **An estimated 54 million people in the US have some type of disability**
  - Wireless devices with accessible emergency alerts can increase the safety & independence of people with disabilities

Wireless Use Among People with Disabilities

Survey of User Needs -- RERC Consumer Advisory Network

1600 plus people with disabilities

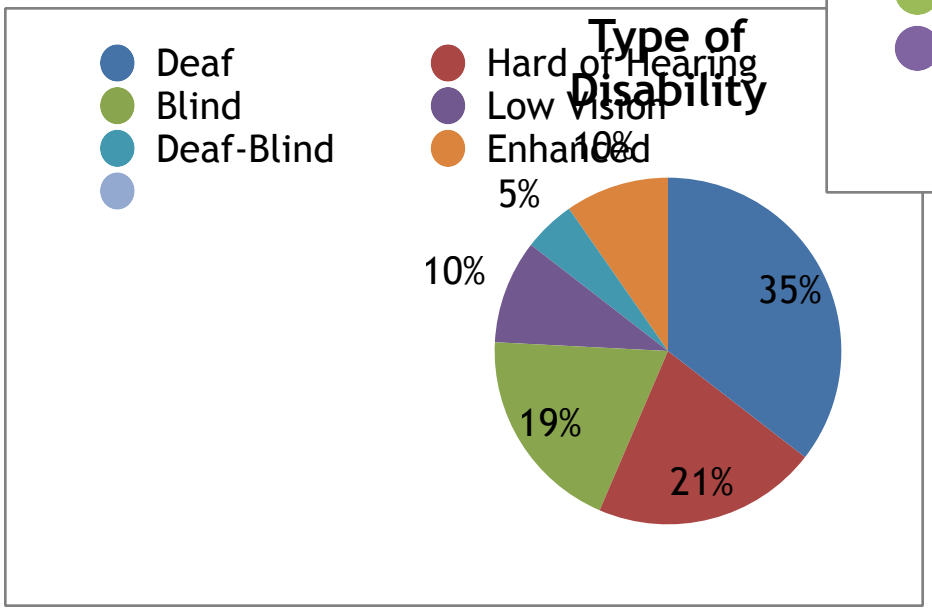
2009:

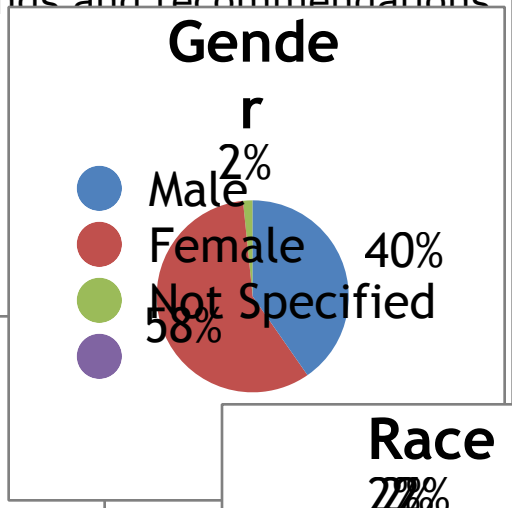
- **85%** use wireless products
- **77%** state access to wireless important
- **65%** state a wireless device was important for its role in emergencies

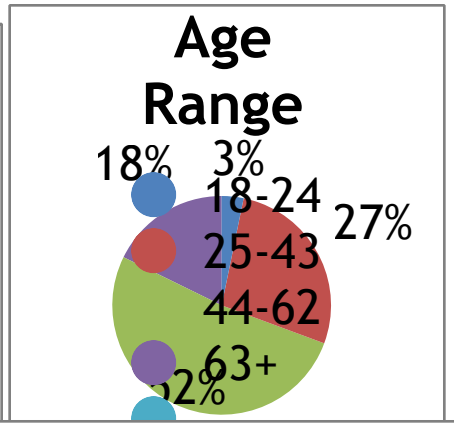
Increased Use = Increased Accessibility & Reliability

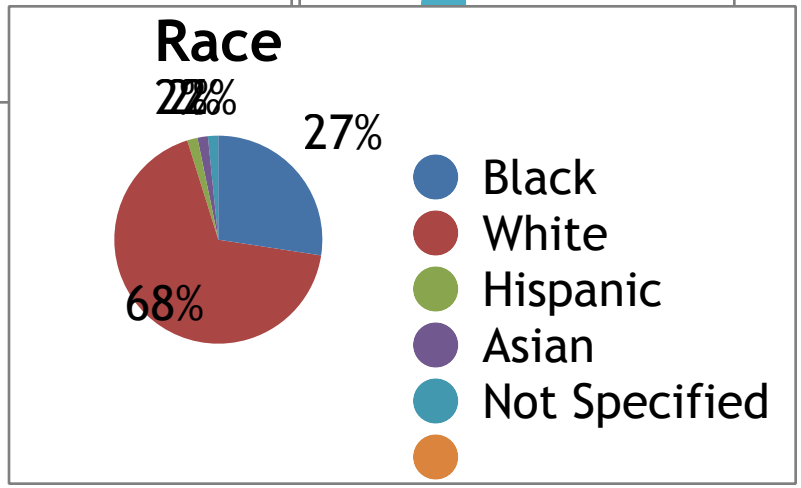
Recruitment & Demographics

The Process: Over 100 participants. 12 field trials. Pre and post-test questionnaires. Tabulated data. Reported findings and recommendations



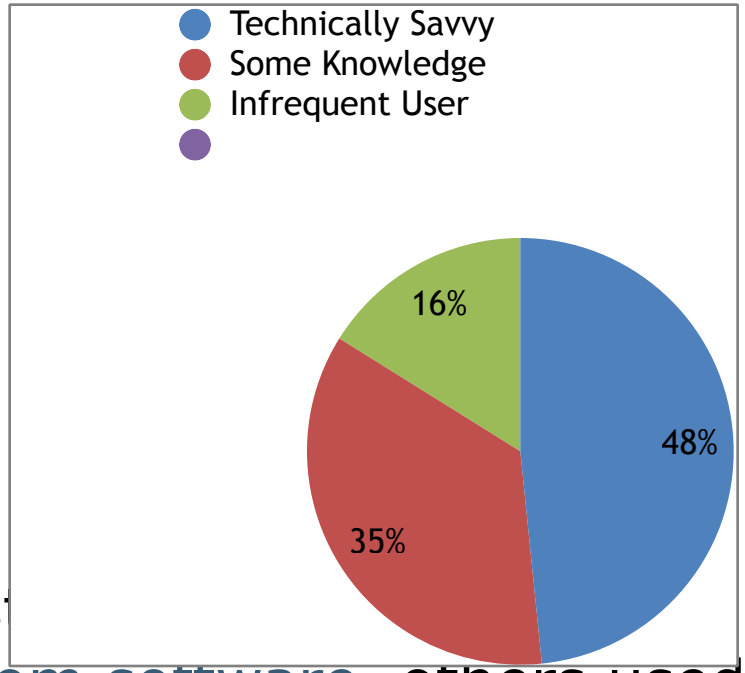






The Testing Begins

- Level of experience with wireless devices varied



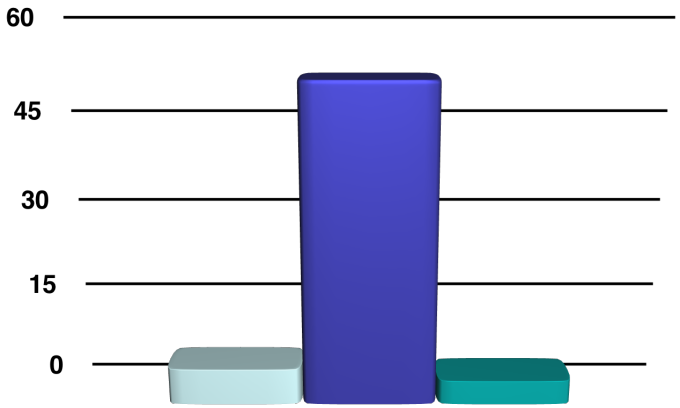
- Some tes
  with custom software, others used standard Blackberry devices

Testing Formats

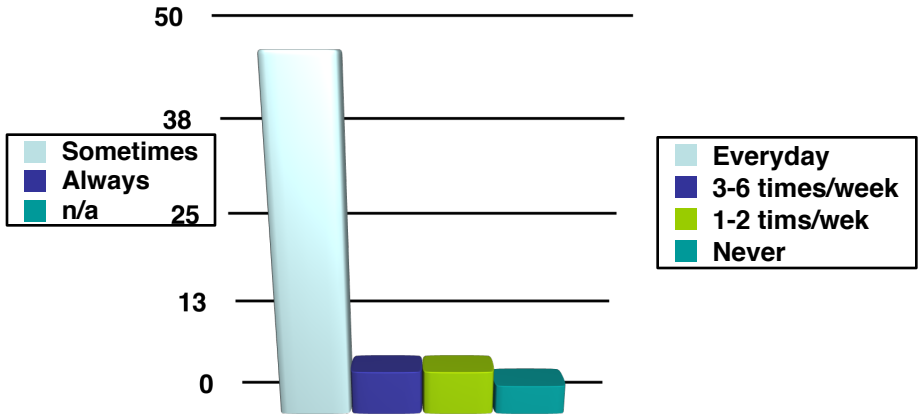
- Standard **SMS text messages** and Web pages
  - Essential information in SMS body
  - Link to web page with full alert details

- **Custom software** with enhanced accessibility features
  - **Distinctive attention signals** using audio and vibration
  - Synthesized **speech to read** alerts
  - Automatic identification of SMS message as emergency alert
  - The ability to **override phone settings** that may interfere with the notification of a critical alert

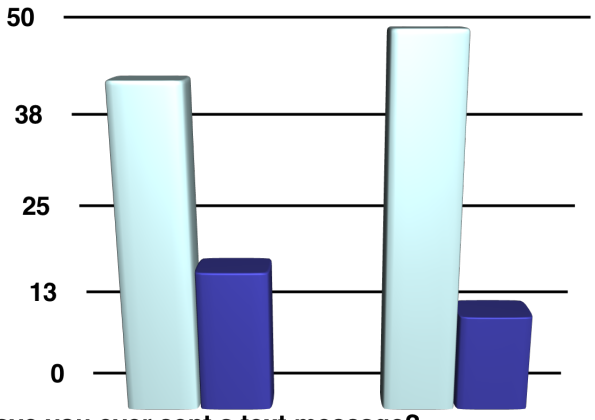
Some Pre-Test Questions



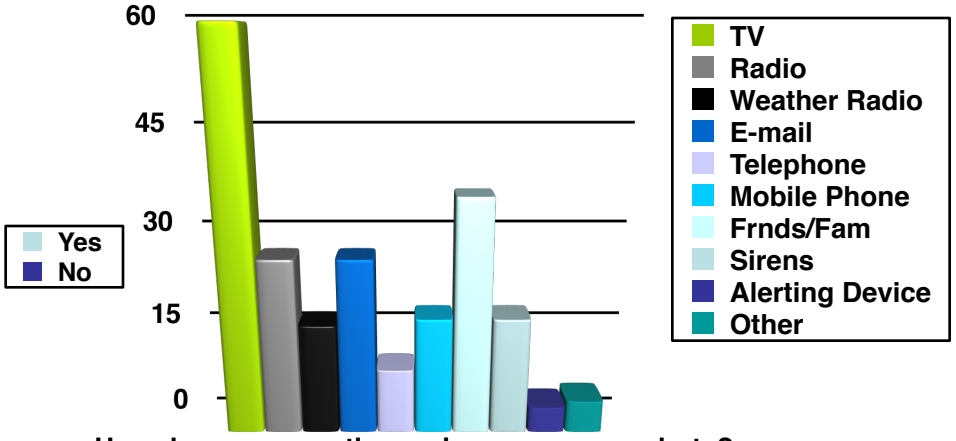
How often do you carry a mobile phone?



How often do you us your mobile phone?



Have you ever sent a text message?



How do you currently receive emergency alerts?

Emergency Alert System Trials

- **EAS Trials** (Nine groups at three sites):
  - **Site 1: 94%** of blind, low vision participants stated wireless emergency alerting system they evaluated was an improvement over other methods they currently use for receiving emergency alerts.
  - **Site 2: 81%** of deaf and hard-of-hearing and deaf-blind found the alerts over client software to be an improvement.
  - **Site 3: 92%** of deaf and hard-of-hearing and visually impaired found devices an improvement.
- **EAS Post-field tests: 83%** of people with sensory limitations said receiving emergency alerts via wireless devices was highly desirable.

Findings of CMAS Trials

- **Commercial Mobile Alerting System**
  - Followed 2008 FCC rulemaking CMAS parameters
    - Included improvements from previous trials
    - reduction in number of characters, no URL's, varied vibrating cadences.
    - Of those who participated in previous tests **77%** stated it was an improvement.
  - **83%** of persons with visual limitations found the accessible CMAS system to be an improvement over their current source of receiving emergency alerts.
  - **70%** of persons with hearing limitations found the CMAS alerts to be an improvement.

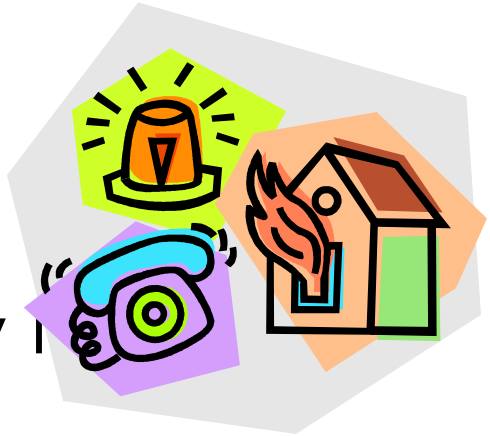
Participant Comments on Alerting

- "This makes me feel safer, especially outside or traveling"
- Adjust alert vibration strength and length
- Adjust alert audio strength and length
- Turn cell phone on if alert received
- Vary alert signals for different levels of messages
- Vary time delay between alert and message
- Blinking alert light

Participant Comments on Message

- "Cell phone is convenient way to receive alerts"
- Control which type of alert message to receive
- Capability to repeat alert message
- Text to speech capability (improved synthetic voice)
- Speech to text capability
- Adjustable font size and backlit panel
- Adjustable speech rate and volume

Participant Comments



ADDITIONAL FEATURES

- Where to get additional emergency i
  (URL, TV, radio, etc.)
- Device output for connection to other systems (bed shaker, house alarm, strobe light, etc.)
- Tests messages to know it is working
- Free alerts and make service not too expensive
- Large button size or Braille

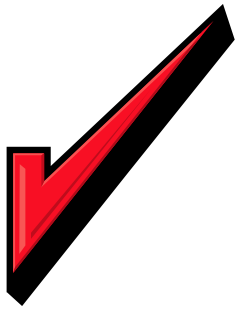
ASL Focus Groups

"American Sign Language (ASL) is the fourth most common language used in America."

- **Earlier feedback from Deaf participants suggested need to discuss ASL alerts**
  - All participants felt that ASL was an improvement over text alone
  - NWS phrases "low lying areas", "take cover", "seek shelter" and "go to safe place" do not translate well into Deaf English
  - Use symbols (tornado swirl, flood wave, flame, etc)

Conclusions

- ➢ Mobile devices can offer accessible solutions
- ➢ Include people with disabilities in R&D
- Engage emergency management community
- More efficient use of public safety and emergency management personnel
- Equal access benefits everyone; 20% of population by 2030 will have some disability



http://www.wirelessrerc.org/about-us/projects/development-projects

- **Wireless Emergency Communications Project Team**
  - ***Helena Mitchell**, Co-project Director
  - **Frank Lucia**, Co-project Director
  - **Ed Price**, Technical Director
  - ***Jeremy Johnson**, Research Scientist
  - ***Salimah LaForce**, Information Analyst
  - **Ben Lippincott**, Industry Liaison
  - **Laurel Yancey**, Chief Policy Officer

Contact:
Helena Mitchell, Wireless RERC, PI
Helena.mitchell@cacp.gatech.edu
404.385.4640

Special thanks to the National Institute on Disability and Rehabilitation Research (NIDRR) of the U.S. Department of Education for its sponsorship under grant number H133E060061.